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1. A method for multi-dimensional orthogonal resource hopping multiplexing communication comprising a digital communication system that includes a primary communication station and secondary communication stations and a multi-dimensional orthogonal resource hopping multiplexing system for statistical multiplexing of the synchronous communication channels from said primary communication station to the secondary communication stations.

2. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 1,

wherein said multi-dimensional orthogonal resource hopping multiplexing system comprises;

a multi-dimensional hopping pattern generator which is located in the transmitter of the primary communication station,

a data symbol modulator that selects the corresponding orthogonal resource patterns in terms of the output from said multi-dimensional hopping pattern generator

a collision detector and controller that detects whether a collision occurs or not between the multi-dimensional hopping patterns and compares the consistency of the data symbols toward the secondary communication stations

3. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 1,

wherein said channels can be distinguished through hopping multi-dimensional orthogonal resource coordinates due to a synchronization from said primary communication station to a plurality of secondary communication stations.

4. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 3,

wherein said multi-dimensional orthogonal resource coordinates of dimension N can be represented as (orthogonal resource#1, orthogonal resource#2, ..., orthogonal resource#N)

5. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 4,

wherein said orthogonal resource#1 is frequency, the orthogonal resource#2 is transmission time or position of data symbol and orthogonal resource#3 is orthogonal code.

6. (Amended-Clean Text) The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed claim 1,

wherein said multi-dimensional orthogonal resource hopping is statistical multiplexing using a one-dimensional orthogonal resource hopping multiplexing method in which only one coordinate of the orthogonal axes hops.

7. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 6,

wherein said one-dimensional orthogonal resource is frequency.

8. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 6,

wherein said one-dimensional orthogonal resource is transmission time or position of data symbol.

9. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 6,

wherein said one-dimensional orthogonal resource is orthogonal code.

10. (Amended-Clean Text) The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 1,

wherein said multi-dimensional orthogonal resource hopping is statistical multiplexing using a two-dimensional orthogonal resource hopping multiplexing method in which two coordinates of the orthogonal axes hops.

11. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 10,

wherein said two-dimensional orthogonal resource consists of (frequency, transmission time or position).

12. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 10,

wherein said two-dimensional orthogonal resource consists of (frequency, orthogonal code).

13. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 10,

wherein said two-dimensional orthogonal resource consists of (transmission time or position, orthogonal code).

14. (Amended-Clean Text) The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 1,

wherein said multi-dimensional orthogonal resource hopping is statistical multiplexing using a three-dimensional orthogonal resource hopping multiplexing method in which three coordinates of the orthogonal axes undergo hopping.

15. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 14,

wherein said three-dimensional orthogonal resource consists of (frequency, transmission time or position, orthogonal code).

16. (Amended-Clean Text) The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 1,

wherein said multi-dimensional orthogonal resource hopping of dimension N is statistical multiplexing using a multi-dimensional orthogonal resource hopping multiplexing method in which multi-dimensional)orthogonal resource #1, orthogonal resource #2, ..., orthogonal resource #N) coordinates of the orthogonal axes undergoes hopping.

17. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 5,

wherein said orthogonal code is Hadamard Code.

18. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 5,

wherein said orthogonal code is Orthogonal Variable Spreading Factor Code.

19. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 5,

wherein said orthogonal code is orthogonal Gold Code.

20. (Amended-Clean Text) The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 1,

wherein said multi-dimensional orthogonal resource hopping patterns between the secondary communication stations, which are allocated by said primary communication station to said secondary communication stations at the beginning of a communication and are released at the end of the communication, are dependent.

21. (Amended-Clean Text) The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 1,

wherein said multi-dimensional orthogonal resource hopping patterns is allocated to each secondary communication station uniquely and therefore, become independent between the secondary communication stations.

22. (Amended-Clean Text) The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 1,

wherein said multi-dimensional orthogonal resource hopping multiplexing is carried out for statistically sparse or bursty channels in order to attain statistical multiplexing gain.

23. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 22,

wherein said bursty channels are communication channels toward the secondary communication stations whose transmission rate varies below the allocated basic transmission rate at the time of a call establishment.

24. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 22,

wherein said bursty channels are communication channels toward the secondary communication stations whose transmission rate varies below the allocated average transmission rate at the time of a call establishment.

25. (Amended-Clean Text) The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 1,

wherein the physical channel control command toward a secondary communication station is transmitted by using a separate physical channel.

26. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 25,

wherein said physical channel includes the transmission power control command for the secondary communication station.

27. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 25,

wherein said physical channel includes the transmission rate of the primary communication station.

28. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 25,

wherein said physical channel contains the physical channel control command for the secondary communication station after time division multiplexed.

29. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 28,

wherein said physical channel does not collide with other orthogonal transmission channels from the primary communication station.

30. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 29,

wherein multi-dimensional hopping patterns which do not collide, are used in order not to collide said physical channel with other orthogonal transmission channels from the primary communication station.

31. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 29,

wherein fixed orthogonal resource allocation like the conventional orthogonal resource division multiplexing method is included so that said physical channel does not collide with other orthogonal transmission channels from the primary communication station.

32. (Amended-Clean Text) The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 1,

wherein said multi-dimensional orthogonal resource hopping patterns for a statistical multiplexing are pseudo-randomly generated.

33. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 32,

wherein said pseudo-randomly generated multi-dimensional orthogonal resource hopping patterns are generated by Pseudo Noise (PN) sequence generators.

34. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 32,

wherein a plurality of said multi-dimensional orthogonal resource hopping patterns for statistical multiplexing can be allocated to one of the secondary communication stations according to the transmission data rate of the primary communication station.

35. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 34,

wherein a plurality of hopping patterns toward one of the secondary communication stations undergo dependent hopping in a communication by said multi-dimensional orthogonal resource hopping patterns in order to avoid collisions.

36. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 34,

wherein said communication by said multi-dimensional orthogonal resource hopping patterns allows collisions by undergoing independent hopping

37. (Amended-Clean Text) The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 1,

wherein said communication by said multi-dimensional orthogonal resource hopping patterns periodically repeat on the basis of a frame unit.

38. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 37,

wherein said frame is an independent data unit based on the channel coding.

39. (Amended-Clean Text) The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 1,

wherein the collisions of multi-dimensional orthogonal resource hopping patterns occurring from independent multi-dimensional orthogonal resource hopping patterns of said channels toward the secondary communication stations can cause not to transmit the data symbols of all corresponding channels during the symbol duration by previously detecting collisions at the primary communication station.

40. (Amended-Clean Text) The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 1,

wherein said data symbols are transmitted at the time of collision of said multi-dimensional orthogonal resource hopping patterns shows that all the transmitting data symbols of corresponding channels are identical.

41. (Amended-Clean Text) The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 1,

wherein said data symbols are not transmitted when a comparison at the time of a collision of said multi-dimensional orthogonal resource hopping patterns shows that all the transmitting data symbols of corresponding channels are not identical.

42. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 41,

wherein the transmission power is increased for the transmitting data symbols after the transmitting data symbols are not transmitted because the transmitting data symbols are not identical at the time of a collision of said multi-dimensional orthogonal resource hopping patterns.

43. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 42,

wherein said transmission power increase is allowed in such an amount and at an interval given by the system parameters.

44. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 43,

wherein said two system parameters depend on the location of the data symbols which are not transmitted.

45. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 44,

wherein said two system parameters are equal to or greater than zero.

46. (Amended-Clean Text) The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 1,

wherein said hopping pattern collision processing method is only carried out when a serious error occurs during a channel decoding process in the secondary communication stations due to an overlapping of transmission antenna beams of the channels from the primary communication station where the hopping patterns collide.

47. (Amended-Clean Text) The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 1,

wherein said multi-dimensional hopping pattern collision processing method is only carried out when a serious error occurs during a channel decoding process in the secondary communication stations due to an overlapping of transmission antenna beams of the channels in the primary communication station where the multi-dimensional hopping patterns collide.

48. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 1,

wherein a pilot signal is used for coherent demodulation through acquisition, tracking and phase estimation.

49. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 48,

wherein said multi-dimensional hopping patterns use the hopping patterns which do not collide in order to protect from a loss of phase distortion compensation capability due to collisions.

50. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 48,

wherein said pilot signal exists in all sub-carriers that are involved in frequency hopping multiplexing.

51. The method for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 49,

wherein said hopping patterns which do not collide include an allocation of fixed orthogonal resource like the multi-dimensional orthogonal resource division multiplexing method.

52. An apparatus for multi-dimensional orthogonal resource hopping multiplexing communication comprising;

a multi-dimensional orthogonal resource hopping pattern generator

a multi-dimensional orthogonal resource generator that generates multi-dimensional orthogonal resource according to said multi-dimensional hopping patterns

a multi-dimensional hopping pattern collision detector that detects the collision of said multi-dimensional hopping patterns.

53. The apparatus for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 52,

wherein said multi-dimensional orthogonal resource generator consists of a frequency synthesizer.

54. The apparatus for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 52,

wherein said multi-dimensional orthogonal resource generator consists of buffers for controlling the position of transmission data symbol.

55. The apparatus for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 52,

wherein said multi-dimensional orthogonal resource generator consists of an orthogonal code generator.

56. The apparatus for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 52,

wherein said multi-dimensional orthogonal resource generator consists of a combination of a frequency synthesizer, buffers, a spreading orthogonal code generator.

57. The apparatus for multi-dimensional orthogonal resource hopping multiplexing communication as claimed in claim 52,

wherein said multi-dimensional hopping pattern collision detector comprising;

a transmitting data symbol comparator which compares whether the data symbols for the corresponding channels are identical or not at the time of collision of said multi-dimensional hopping patterns,

a puncturer which can stop the transmission of the data symbol when said comparator indicates that all the corresponding data symbols are not identical.

58. An apparatus for multi-dimensional orthogonal resource hopping multiplexing communication of a spread spectrum communication comprising a digital communication system that includes a transmission apparatus of the primary communication station and a reception apparatus of the secondary communication station,

wherein said transmission apparatus of the primary communication station comprising;

a channel encoder

a multi-dimensional orthogonal resource hopping pattern generator

a multi-dimensional orthogonal resource generator that generates multi-dimensional orthogonal resources according to said multi-dimensional hopping pattern.

59. An apparatus for multi-dimensional orthogonal resource hopping multiplexing communication of a spread spectrum communication comprising a digital communication system for multi-dimensional orthogonal resource hopping multiplexing which operates with two separate orthogonal resource groups comprising;

a first orthogonal resource group for a division multiplexing by fixed and exclusive allocation of orthogonal resources

a second orthogonal resource group for a statistical multiplexing through orthogonal resource hopping.

60. An apparatus for multi-dimensional orthogonal resource hopping multiplexing communication of a spread spectrum communication as claimed in claim 59,

wherein a multi-dimensional orthogonal resource division multiplexing is carried out for a less bursty channels by fixedly and exclusively allocating the orthogonal resources

in said first orthogonal resource group to the transmitting data symbols.

61. An apparatus for multi-dimensional orthogonal resource hopping multiplexing communication of a spread spectrum communication as claimed in claim 59,

wherein a multi-dimensional orthogonal resource hopping multiplexing is carried out using multi-dimensional orthogonal resource hopping patterns for a bursty channels by using the orthogonal resources in said second orthogonal resource group.